nephron loss, cardiac dysfunction and heart failure due to left ventricular hypertrophy and myocyte loss, stroke, and even diabetes. Therefore, modulation (reduction/removal) of this increased sympathetic activity can slow or prevent the progression of these diseases.

[0005] Although ablation of such nerves can have positive effects on drug resistant hypertension and glucose metabolism abnormality, current methodologies for denervation (e.g. ablation) are conducted without adequate feedback (with respect to the site of a denervation event, the extent of denervation, the effect of denervation on local physiology, etc.).

SUMMARY

[0006] One objective of this disclosure is to provide a microsurgical tool for monitoring, evaluating, mapping, and/or modulating electrophysiological activity in the vicinity of an organ or a vessel within a body. Another objective is to provide a system and method for evaluating the sympathetic tone of a subject. Yet another objective is to provide a system for neuromodulating an anatomical site in the vicinity of an organ or vessel within a body. Another objective is to provide an implantable device for monitoring and/or performing a neuromodulation procedure.

[0007] The above objectives are wholly or partially met by devices, systems, and methods according to the appended claims in accordance with the present disclosure. Features and aspects are set forth in the appended claims, in the following description, and in the annexed drawings in accordance with the present disclosure.

[0008] According to a first aspect there is provided, a microsurgical tool for monitoring electrophysiological activity within the vicinity of an organ within a body, the microsurgical tool including an endoscopically deliverable elongate structure configured so as to extend from an entry site within the body to the vicinity of the organ; and a sensing tip electrically and mechanically coupled to the elongate structure, configured to interface with tissues in the vicinity of the organ, the sensing tip configured to measure local neural activity associated with the tissues in the vicinity of the organ and to convey one or more electrophysiological signals associated with the local neural activity.

[0009] In aspects, the electrophysiological signals may be related to one or more of water concentration, tissue tone, evoked potential, remotely stimulated nervous activity,

decision if it is completed. The method includes making a decision as to if the overall surgery is completed. If it is not complete the method includes moving (i.e. so as to remove the tool from the anatomical site, move to another target location, etc.) the tool to another target surgical site, and/or selecting another set of electrodes to test for the presence of a target tissue. If the overall procedure is complete, the method includes detaching the tool from the surgical site. Further aspects of such methods are discussed throughout the present disclosure.

[00254] Figs. 4a-b show aspects of signals associated with a method for monitoring electrophysiological activity at one or more locations on a body in accordance with the present disclosure. Fig. 4a shows an exemplar pulse train 405, highlighting various aspects that may be adjusted during a surgical intervention so as to better elucidate the physiological signals from at a monitoring location. A non-limiting example of the pulse train characteristics that may be varied to highlight characteristics of the evoked response include the amplitude 420, pulse spacing 415, pulse width 410, the number of pulses, etc. Other aspects of suitable stimulation signals are discussed throughout the present disclosure.

[00255] Fig. 4b shows an electrophysiological response measured at a monitoring location in accordance with the present disclosure. The time characteristics of the evoked response demonstrates aspects of the sensed signal such as latency 425, amplitude 430, and character (frequency content, signal shape, etc.) that may change as surgical procedure is performed on the target tissues. Other aspects of the evoked signal responses are discussed throughout the present disclosure.

[00256] Figs. 5a-b show aspects of a multi-tool surgical system for performing a surgical procedure in accordance with the present disclosure. The system includes a plurality of self-wrapping tools 510a, 510b (in this case, two self-wrapping tools), arranged around the circumference of a target anatomical structure 1 (in this case, a renal artery), and a surgical tool for applying a surgical procedure (in this case an ablation procedure) at one or more surgical locations along the vessel 1. Each self-wrapping tool 510a, 510b includes a plurality of electrodes a-d, A-D for interfacing with the adjacent tissue (here labeled electrodes a-d and electrodes A-D). A target nerve is shown on the

decision if it is completed. The method includes making a decision as to if the overall surgery is completed. If it is not complete the method includes moving (i.e. so as to remove the tool from the anatomical site, move to another target location, etc.) the tool to another target surgical site, and/or selecting another set of electrodes to test for the presence of a target tissue. If the overall procedure is complete, the method includes detaching the tool from the surgical site. Further aspects of such methods are discussed throughout the present disclosure.

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[00257] Figs. 5a-b show aspects of a multi-tool surgical system for performing a surgical procedure in accordance with the present disclosure. The system includes a plurality of self-wrapping tools 510a, 510b (in this case, two self-wrapping tools), arranged around the circumference of a target anatomical structure 1 (in this case, a renal artery), and a surgical tool for applying a surgical procedure (in this case an ablation procedure) at one or more surgical locations along the vessel 1. Each self-wrapping tool 510a, 510b includes a plurality of electrodes a-d, A-D for interfacing with the adjacent tissue (here labeled electrodes a-d and electrodes A-D). A target nerve is shown on the

underlying tissues). The point pressure based microfinger 715 may be swept over the surface of the tissue as one or more aspects monitor related physiological activity elsewhere along the artery 5 or in the body. The point pressure based finger 715, may be configured to apply an ablation current 720 to the tissues, possibly using at least a portion of the holding face 710 as a counter electrode for the RF ablation current. The holding face 710 and the point pressure based finger 715 may be interconnected 725, 730 with a controller, a microcircuit, an interconnect, or the like, each in accordance with the present disclosure.

[00264] Fig. 7b shows an example of a surgical system in accordance with the present disclosure, including two monitoring tools 710a, 710b arranged proximally and distally to a surgical site on a vessel 5. A point pressure based finger 730 is applied to the surgical site and may scan 635 the surgical site in order to find and selectively ablation tissues thereupon (i.e. so as to perform a surgical procedure on a target tissue 6 in accordance with the present disclosure). In aspects, the monitoring tools 710a, 710b may include interconnects 725a, 725b arranged so as to interconnect one or more sensing tips included therein with a controller, a microcircuit, and/or an interconnect each in accordance with the present disclosure.

[00265] Fig. 7c shows aspects of an example of a method for finding a suitable target tissue (e.g. a target nerve) in accordance with the present disclosure. The method includes monitoring electrophysiological activity 750, 760 at electrode locations (i.e. sensory tip locations) on tools A and B, sweeping 770 a point pressure probe along the circumference of the vessel and stopping when a significant change 780 in the electrophysiological activity amongst electrodes on tool A and/or B is detected. Thus determining when the point pressure probe is applying compressive forces to a neural structure located between sensing tips on tool A and tool B. The method may include applying a surgical procedure to the neural structure after identifying the presence thereof, etc.

[00266] Figs. 8a-b show a self-wrapping surgical tool 810 in accordance with the present disclosure. Fig. 8a shows a self-wrapping surgical tool at various stages of actuation, stage A 810a (initial shape), stage B 810b (intermediate shape), and stage C

810c (captured shape) while in the process of capturing 815 a vessel 7. The actuation process may be performed in accordance with the present disclosure. In aspects, the actuation may be performed by an included electroactive material within the self-wrapping tool 810. The self-wrapping tool 810 may be used to actively bias one or more included sensing tips towards the tissues of the underlying anatomy (in this case a vessel 7). The actuator materials, sensing tips, etc. included within the self-wrapping tool 810 may be interconnected 825 with a controller, a microcircuit, and/or an interconnect each in accordance with the present disclosure for purposes of performing a surgical procedure as described herein.

[00267] Fig. 8b shows some aspects of a self-wrapping tool 810 in accordance with the present disclosure. A row of electrodes 830 is shown along a face of the tool 810, configured so as to interface with an adjacent tissue after it has been successfully captured by the tool 810. The figure also shows a cross section of a self-wrapping tool 810 with a laminar structure, demonstrating how such a tool may be built-up in practice. The structure includes one or more actuator layers 840, 845 (optionally including one or more electrode elements). The actuator layers 840, 845 may include an active material in accordance with the present disclosure, a thermoresponsive material, a capillary actuating material, etc. The structure also include a patterned layer with inter dispersed electrode elements 830 (or more generally speaking sensory tips) and isolated regions 835 (e.g. insulating regions) so as to collectively interface 825 with the adjacent tissues. The actuating layers 840, 845 may be configured to change shape upon command, so as to change the overall shape 815 of the tool 810 and capture/release a target anatomical structure within a body.

[00268] Figs. 9a-b show aspects of a soft gripping surgical tool 910 in accordance with the present disclosure. Fig. 9a shows a soft gripping surgical tool 910 including micro-channels 930 to connect 925 one or more ports 920 on the tip of the surgical tool, with a suction source (i.e a vacuum source outside of the body, at the far end of the surgical tool, etc.). Fluid may be drawn 935 through the microchannels 930 in order to interface the surgical tool 910 with a local anatomical site 7. The soft surgical tool 910 may include one or more ports 920 situated along with the microchannels 930. The soft surgical tool may include a soft backing material 915 (e.g. an elastomer, a polymer, etc.) and a central

member (e.g. film, filament, etc.) in order to control and/or limit distension of the soft-gripping tool 910 during an actuation process. The surgical tool 910 may include one or more sensing tips each in accordance with the present disclosure, optionally included near to one or more of the ports 920, or along the port face, so as to interface with the target anatomy 7 during a procedure.

[00269] Fig. 9b shows aspects of the soft gripping surgical tool 910 including an array of electrode 940 based sensing tips (4 electrodes shown in Fig. 9b). The electrodes 940 may be electrically connected to circuitry elsewhere upon the surgical tool 910, to a local control circuit, an interconnect, or the like, each in accordance with the present disclosure. In aspects, the electrodes 940 may be electrically routed via a flexible circuit included in the central member 945, via microwires, via a cable assembly, etc. In the cross section shown, each of the electrodes 940 includes a centralized port 920 located therein, the ports 920 are connected to the micro-channels 930, which then run along the length of the tool 910 back to a vacuum source 925 (not explicitly shown). The micro-channels 930 may be placed off the neutral axis of the tool 910, such that a vacuum applied thereto may assist in bending 955 the tool 910 towards the target tissue locations. The tool 910 may include a soft backing material 950 (e.g. an elastomer, a polymer, etc.) and a central member (e.g. film, filament, etc. not explicitly shown) in order to control and/or limit distension of the soft-gripping tool 910 during an actuation process 955.

[00270] Fig. 10 shows aspects of a soft gripping tool 1010 for use in a surgical ~~tool~~ procedure in accordance with the present disclosure. The soft gripping tool 1010 includes one or more micro-channels 1020 asymmetrically situated off of the neutral axis of the tool 1010 such that application of pressure, vacuum, or changes in the fluid level therein (i.e. via fluid exchange 1025a with a fluid source, vacuum pump, etc.) may be used to bend 1013 the tool towards or away from a surgical site. The tool 1010 may include a substrate 1015, the substrate 1015 including one or more sensing tips 1017, each in accordance with the present disclosure for interfacing with an adjacent target tissue during a procedure. The sensing tips 1017 may be coupled 1025b with a controller, a microcircuit, an interconnect, or the like each in accordance with the present disclosure to perform one or more measurements, stimulations, and/or ablation procedures during the course of a procedure.

on the body (such as an entry port, etc.). The tether 1430 may include means for electrically communicating between an externally placed device and the interfacing potion of the tool 1420 and/or sensing tips include therein. The tether 1430 may include a lubricous coating to substantially limit bonding between the tether 1430 and adjacent tissues during the placement period. The interfacing portion of the tool 1420 may be equipped to monitor one or more physiological parameters of the adjacent anatomical structure for a prolonged period following placement. A plurality of sensing tips within the interfacing portion of the tool 1420 may be arranged so as to more precisely monitor activity of target anatomy 12, which may be arranged heterogeneously about the target anatomical site 11.

[00279] The second implantable surgical tool 1440 shown in Fig. 14 includes means for wirelessly communicating 1450 with an extracorporeal reader, so as to remotely monitor the surgical site 11 for prolonged periods of time without the need for physical access to the site during the monitoring period. Such an implantable tool 1440 may include a plurality of sensing tips, a microcircuit, etc. each in accordance with the present disclosure. The implantable tool 1440 may further include a power source, or means for harvesting energy from a provided signal (i.e. an RF signal), local kinetic motion, undulation of the underlying anatomical structure 11, or the like. Further aspects of implantable surgical tools 1420, 1440 are discussed elsewhere in the present disclosure.

[00280] Figs 15a-b show aspects of an implantable and at least partially biodegradable surgical tool in accordance with the present disclosure. Fig. 15a shows an implantable surgical tool in accordance with the present disclosure including a clip 1510a, 1510b, 1520 arranged with one or more sensing tips 1535. The implantable surgical tool also includes a biodegradable material (i.e. in this case shown the regions of the clip 1510a, 1510b), configured so as to degrade over a period of time after placement thereof within the body. An optional tether 1540 is attached to the clip 1510a, 1510b, 1520 via a substrate 1530, 1520, the substrate configured to interconnect 1525 one or more of the sensing tips 1535 with a controller, microcircuit, etc. The tether 1540 may be configured to access an extracorporeal reader, an extracorporeal port, a body port, etc. The tether 1540 may be configured for easy removal 1560 of the implantable tool after the monitoring

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[00281] Figs 15a-b show aspects of an implantable and at least partially biodegradable surgical tool in accordance with the present disclosure. Fig. 15a shows an implantable surgical tool in accordance with the present disclosure including a clip 1510a, 1510b, 1520 arranged with one or more sensing tips 1535. The implantable surgical tool also includes a biodegradable material (i.e. in this case shown the regions of the clip 1510a, 1510b), configured so as to degrade over a period of time after placement thereof within the body. An optional tether 1540 is attached to the clip 1510a, 1510b, 1520 via a substrate 1530, the substrate configured to interconnect 1525 one or more of the sensing tips 1535 with a controller, microcircuit, etc. The tether 1540 may be configured to access an extracorporeal reader, an extracorporeal port, a body port, etc. The tether 1540 may be configured for easy removal 1560 of the implantable tool after the monitoring

tissue location; monitoring 1921 one or more physiological parameters at the tissue location or another location in the body; analyzing 1922 the stimulation 1920 and/or the monitoring 1921 processes to generate a result set (e.g. one or more parameters determined from the data sets associated with either the stimulation 1920, and/or the monitoring 1921, etc.). The method may include assessing the result set to decide if the location is suitable for performing a surgical procedure, if it is not then the system may move 1924 and/or assess an alternative location in the body. If the location is suitable for a surgical procedure then the method may include performing 1926 at least a portion of a surgical procedure thereupon and potentially repeat the overall process. The method may include determining from the result set if the surgical procedure has been completed, if so finalize the procedure, if not perform another procedure 1926 and/or move 1924 to a new location.

[00294] The method may include moving to another surgical site, stimulating an alternative tissue site, cleanup and/or removal of a surgical tool from the body, or the like.

[00295] One or more aspects of the method may be performed with a surgical tool in accordance with the present disclosure.

[00296] The method may include performing at least part of a surgical procedure (e.g. ablation, chemical delivery, etc.), and monitoring at a location (i.e. the first location, an alternative location, etc.) to determine if the surgical procedure was successful.

[00297] Figs. 20a-c shows aspects of a surgical tool system in accordance with the present disclosure. The surgical system includes an endoscopic tool 2010 in accordance with the present disclosure with a control arm 2020 and a tissue interfacing tool ~~2030~~ 2022 including one or more sensing tips each in accordance with the present disclosure. The surgical system includes an optional stimulating probe 2038, configured to interface with a tissue site elsewhere on an anatomical point of interest 18 (e.g. as shown a renal artery or a nerve plexus 19). The stimulating probe 2038 may include an electrode 2045 (for electrically interfacing with a tissue site) and an insulator 2040 (for substantially isolating the probe from surrounding tissues). The stimulating probe 2038 and the

endoscopic tool 2010 may be used in conjunction to perform a surgical procedure in accordance with the

present disclosure. In aspects, the tissue interfacing tool 2030 may be electrically interconnected 2025 with a controller, a microcircuit, an operator, an interconnect, etc.

[00297] Fig. 20b shows aspects of a non-limiting example of a tissue interfacing tool 2010 in accordance with the present disclosure. The tool 2010 includes a row of electrode elements 2030 arranged so as to cover at least a portion of an adjacent vessel during use (optionally in a circumferential direction, a longitudinal direction, etc.). Other aspects of such tools are discussed elsewhere in the present disclosure.

[00298] Fig. 20c show aspects of a non-limiting example of a tissue interfacing tool 2050 in accordance with the present disclosure. The tool 2050 includes multiple rows of electrode elements 2055, 2060 arranged so as to cover at least a portion of an adjacent vessel during use (optionally in a circumferential direction, a longitudinal direction, etc.). Other aspects of such tools are discussed elsewhere in the present disclosure.

[00299] The interfacing tool 2050 includes a local control circuit 2070 in accordance with the present disclosure. In this non-limiting example, the local control circuit 2070 is configured to multiplex, pre-amplify, and/or digitize signals obtained 2065 from one or more electrodes 2055, 2060 on the tissue interfacing tool 2050 and to communicate 2075 with an external controller, interconnect, operator, etc. during use.

[00300] Figs. 21a-b show aspects of an implantable device for sustained release of a neuromodulating substance in accordance with the present disclosure. Fig. 21a shows an implantable device 2105 placed in the vicinity of a renal artery 20 as part of a procedure in accordance with the present disclosure (i.e. as part of a denervation procedure). In aspects, such an implantable device 2105 may be placed by a surgical tool in accordance with the present disclosure. In aspects, the implantable device 2105 may include a neuromodulating substance 2109, perhaps confined in a retaining medium (i.e. a hydrogel matrix, etc.) and may leach into the surrounding tissues over time, after placement during a surgical procedure. In aspects, the neuromodulating substance may be a potent denervating agent (i.e. a neurotoxin, a botulinum toxin, a tetrodotoxin, a tetraethylammonium, a chlorotoxin, a curare, a conotoxin, a bungarotoxin, arsenic, ammonia, ethanol, hexane, nitric oxide, glutamate, resiniferatoxin, alchohol, phenol,

present disclosure. In aspects, the endoscopic tool 2010 may be electrically interconnected 2025 with a controller, a microcircuit, an operator, an interconnect, etc.

[00298] Fig. 20b shows aspects of a non-limiting example of a tissue interfacing tool 2010 in accordance with the present disclosure. The tool 2010 includes a row of electrode elements 2030 arranged so as to cover at least a portion of an adjacent vessel during use (optionally in a circumferential direction, a longitudinal direction, etc.). Other aspects of such tools are discussed elsewhere in the present disclosure.

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[00301] Figs. 21a-b show aspects of an implantable device for sustained release of a neuromodulating substance in accordance with the present disclosure. Fig. 21a shows an implantable device 2105 placed in the vicinity of a renal artery 20 as part of a procedure in accordance with the present disclosure (i.e. as part of a denervation procedure). In aspects, such an implantable device 2105 may be placed by a surgical tool in accordance with the present disclosure. In aspects, the implantable device 2105 may include a neuromodulating substance 2109, perhaps confined in a retaining medium (i.e. a hydrogel matrix, etc.) and may leach into the surrounding tissues over time, after placement during a surgical procedure. In aspects, the neuromodulating substance may be a potent denervating agent (i.e. a neurotoxin, a botulinum toxin, a tetrodotoxin, a tetraethylammonium, a chlorotoxin, a curare, a conotoxin, a bungarotoxin, arsenic, ammonia, ethanol, hexane, nitric oxide, glutamate, resiniferatoxin, alchohol, phenol,

etc.), a neuroblocking agent (capaicin, an anesthetic, lidocaine, tetanus toxin, quaternary ammonium salts, a pachycurare, a leptocurare, acetylcholine, aminosteroids, etc.).

[00301] In aspects, the implantable device 2105 may be injected into the body and cross-linked in place in order to form the final structure. The retaining medium may be configured so as to crosslink via a radial polymerization procedure (i.e. photopolymerization), a click polymerization procedure (i.e. an oxime click chemistry based hydrogel), or the like. Such form-in-place hydrogels known in the art of bioscaffold formation and bioadhesives may be adapted for use in this application.

[00302] In aspects, the retaining medium may be configured with one or more biodegradable aspects, such that over time (i.e. in a controlled fashion), the retaining medium may breakdown and further neuromodulating substance may be released into the surrounding tissues.

[00303] Fig. 21b shows an implantable device 2122 including a neuromodulating substance 2124 in accordance with the present disclosure placed within the renal pelvis of a kidney 24. In aspects, the implantable device 2122 may have been placed 2126, injected, or formed in place via access through the ureter 23, through the wall of the kidney 24, etc. In aspects, the implantable device 2122 may be formed with a shape (i.e. a cage, a horned shape, etc.) so as to improve retention of the implanted device within the renal pelvis of the kidney 24. The implantable device 2122 may include a retaining medium in accordance with the present disclosure for providing a controlled release of the neuromodulating substance into the renal pelvis of the kidney 24.

[00304] In aspects, the implantable devices discussed in Figs. 21a,b may be combined with the implantable devices discussed in Figs. 14, 15a,b, 22, etc. in order to provide a means for monitoring the effect of the neuromodulating substance over time, for following up on a surgical procedure, etc.

[00305] Fig. 22 shows aspects of an implantable device for monitoring and/or modulating neural activity in accordance with the present disclosure. The implantable device includes one or more microfingers 2210 each in accordance with the present disclosure. Each microfinger includes one or more sensing tips 2215a-d configured so as to monitor one or physical or physiological parameters in the vicinity thereof during a

etc.), a neuroblocking agent (capaicin, an anesthetic, lidocaine, tetanus toxin, quaternary ammonium salts, a pachycurare, a leptocurare, acetylcholine, aminosteroids, etc.).

[00302] In aspects, the implantable device 2105 may be injected into the body and cross-linked in place in order to form the final structure. The retaining medium may be configured so as to crosslink via a radial polymerization procedure (i.e. photopolymerization), a click polymerization procedure (i.e. an oxime click chemistry based hydrogel), or the like. Such form-in-place hydrogels known in the art of bioscaffold formation and bioadhesives may be adapted for use in this application.

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[00305] In aspects, the implantable devices discussed in Figs. 21a,b may be combined with the implantable devices discussed in Figs. 14, 15a,b, 22, etc. in order to provide a means for monitoring the effect of the neuromodulating substance over time, for following up on a surgical procedure, etc.

[00306] Fig. 22 shows aspects of an implantable device for monitoring and/or modulating neural activity in accordance with the present disclosure. The implantable device includes one or more microfingers 2210 each in accordance with the present disclosure. Each microfinger includes one or more sensing tips 2215a-d configured so as to monitor one or physical or physiological parameters in the vicinity thereof during a

WHAT IS CLAIMED IS:

1. A microsurgical tool for monitoring electrophysiological activity within the vicinity of an organ within a body, the microsurgical tool comprising:

- an endoscopically deliverable elongate structure configured so as to extend from an entry site within the body to the vicinity of the organ; and
- a sensing tip electrically and mechanically coupled to the elongate structure, configured to interface with tissues in the vicinity of the organ, the sensing tip configured to measure local neural activity associated with the tissues in the vicinity of the organ and to convey one or more electrophysiological signals associated with the local neural activity.

2. The microsurgical tool in accordance with claim 1, wherein the electrophysiological signals are related to one or more of water concentration, tissue tone, evoked potential, remotely stimulated nervous activity, sympathetic nervous activity, an electromyographic signal [EMG], a mechanomyographic signal [MMG], a local field potential, an electroacoustic event, vasodialation, vessel wall stiffness, muscle sympathetic nerve activity [MSNA], central sympathetic drive, nerve traffic, or combinations thereof.

3. The microsurgical tool in accordance with claim 1 or 2, wherein the sensing tip comprises one or more electrodes.

4. The microsurgical tool in accordance with claim 3, wherein one or more of the electrodes comprises embossed, plated, and/or filament loaded structures thereupon.

17. The microsurgical tool in accordance with claim 15 or 16, wherein the therapeutic substance is selected from a chemical, a drug substance, a neuromodulating substance, a neuroblocking substance, an acid, a base, a denervating agent, or a combination thereof.

18. The microsurgical tool in accordance with any one of claims 15 – 17, wherein the therapeutic substance is a selected from a neurotoxin, a botulinum toxin, a tetrodotoxin, a tetraethylammonium, a chlorotoxin, a curare, a conotoxin, a bungarotoxin, arsenic, ammonia, ethanol, hexane, nitric oxide, glutamate, resiniferatoxin, alchohol, phenol, capaicin, an anesthetic, lidocaine, tetanus toxin, quaternary ammonium salts, a pachycurare, a leptocurare, acetylcholine, aminosteroids, or a combination thereof.

19. The microsurgical tool in accordance with any one of claims 15 – 18, wherein the therapeutic substance is comprised within a restraining matrix.

20. The microsurgical tool in accordance with claim 19, wherein the restraining matrix is at least partially biodegradable.

21. The microsurgical tool of claim 1, wherein the at least one sensing tip is part of a clamp structure having an inner surface configured to interface with the tissues in the vicinity of the organ and an outer surface opposite the inner surface.

22. The microsurgical tool of claim 21, wherein the at least one sensing tip comprises one or more electrodes arranged on the inner surface of the clamp and one or more electrodes arranged on the outer surface of the clamp.

23. The microsurgical tool of claim 22, wherein the one or more electrodes on the outer surface of the clamp are configured to determine a reference signal used by the

at least one sensing tip to measure local electrophysiological activity using the one or more electrodes on the inner surface of the clamp.

24. The microsurgical tool of claim 22, wherein the at least one sensing tip is configured to utilize readings obtained from the one or more electrodes on the outer surface of the clamp to cancel out macroscopic action potentials and noise from local readings obtained using the one or more electrodes on the inner surface of the clamp.

25. The microsurgical tool of claim 22, wherein at least one of the one or more electrodes on the outer surface of the clamp is tied to a reference potential to shield the one or more electrodes on the inner surface of the clamp.

26. The microsurgical tool of claim 22, wherein at least one of the one or more electrodes on the outer surface of the clamp is tied to a reference potential to provide a stable reference against which to measure the local neural activity.

27. The microsurgical tool of claim 22, wherein at least one of the one or more of the electrodes on inner surface of the clamp are configured to protrude from the inner surface of the clamp.

28. The microsurgical tool of claim 27, wherein said at least one electrode on the inner surface of the clamp is embossed.

29. The microsurgical tool of claim 27, wherein the one or more electrodes on the inner surface of the clamp comprise at least a first electrode configured to measure the local neural activity and at least a second electrode configured to apply an ablation current.

~~21. A method for determining an afferent electrophysiological activity and an efferent physiological activity in the vicinity of an organ, comprising:~~

~~monitoring electrophysiological activity at a plurality of sites within the vicinity of the organ in regions proximal and distal to a target region as measured along a length of the organ or the location of the organ in relation to a connected neurological structure;~~

~~applying energy to a site within the target region to form a neurological block thereby; and~~

~~extracting an afferent signal from activity in the distal region and an efferent signal from activity in the proximal region.~~

~~22. The method in accordance with claim 21, comprising comparing activity measured in the proximal region and the distal region to determine if the energy application affected the electrophysiological activity in the vicinity of the target region.~~

~~23. The method in accordance with claim 22, comprising evaluating the coherence between activities measured in the proximal region and the distal region.~~

~~24. The method in accordance with claim 23, comprising using the coherence to evaluate the extent of the neural block.~~

~~25. The method in accordance with claim 24, comprising comparing activities from the proximal region and the distal region during the temporary neural block to determine at least one of a bioimpedance, an evoked potential, neural activity, an electromyographic signal, an electrocardiographic signal, a mechanomyographic signal, a local field potential, nervous activity, blood perfusion, tissue oxygenation, tissue carbon dioxide levels, local temperatures, tissue tonal changes and muscular sympathetic nerve activity.~~

~~26. A method for monitoring and/or evaluating electrophysiological activity in the vicinity of a vessel, comprising:~~

~~biasing an electrode against a wall of the vessel from the outside of the vessel; and~~

~~recording one or more electrophysiological signals from the activity in the vicinity of the electrode.~~

~~27. The method in accordance with claim 26, comprising recording one or more of an evoked potential, remote stimulation of nervous activity, an electromyographic signal [EMG], a mechanomyographic signal [MMG], a local field potential, an electroacoustic event, vasodialation, vessel wall stiffness, muscle sympathetic nerve activity [MSNA], central sympathetic drive, tissue tone, nerve traffic, or combinations thereof in the vicinity of the electrode.~~

~~28. The method in accordance with claim 26 or 27 comprising recording electrophysiological activity from a plurality of electrodes.~~

~~29. The method in accordance with any one of claims 26 – 28 comprising cancelling one or more movement artifacts from the recordings.~~